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Low protein corn does not influence finishing pig performance

Abstract

A total of 150 pigs was used to evaluate the effects of corn with different crude protein content on growth performance of finishing pigs. Our objective was to determine if low protein corn might result in poorer pig performance compared with pigs fed diets containing corn with a normal protein content. Control pigs were fed a diet containing corn with a crude protein content of 8.5% and formulated with soybean meal to 14.6% crude protein (.70% lysine). Pigs were also fed a diet with low crude protein corn (7.5%), which was substituted on an equal weight basis for normal corn resulting in a diet containing 13.5% crude protein. Pigs were fed a third diet using low protein corn, but formulated to 14.6% crude protein by increasing the level of soybean meal in the diet. No differences were observed in average daily gain (ADG) and average daily feed intake (ADFI) of the pigs fed any of the experimental diets; however, pigs fed the low protein corn diet without added soybean meal were the most efficient. These results indicate that low crude protein corn (7.5%) will not adversely affect finishing pig growth performance. In addition, supplemental protein apparently is not necessary when using low protein corn in diets for finishing pigs.; Swine Day, Manhattan, KS, November 18,1993

Keywords

Swine day, 1993; Kansas Agricultural Experiment Station contribution; no. 94-194-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 695; Swine; Corn; G-F; Performance

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LOW PROTEIN CORN DOES NOT INFLUENCE FINISHING PIG PERFORMANCE

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Summary

A total of 150 pigs was used to evaluate the effects of corn with different crude protein content on growth performance of finishing pigs. Our objective was to determine if low protein corn might result in poorer pig performance compared with pigs fed diets containing corn with a normal protein content. Control pigs were fed a diet containing corn with a crude protein content of 8.5% and formulated with soybean meal to 14.6% crude protein (.70% lysine). Pigs were also fed a diet with low crude protein corn (7.5%), which was substituted on an equal weight basis for normal corn resulting in a diet containing 13.5% crude protein. Pigs were fed a third diet using low protein corn, but formulated to 14.6% crude protein by increasing the level of soybean meal in the diet. No differences were observed in average daily gain (ADG) and average daily feed intake (ADFI) of the pigs fed any of the experimental diets; however, pigs fed the low protein corn diet without added soybean meal were the most efficient. These results indicate that low crude protein corn (7.5%) will not adversely affect finishing pig growth performance. In addition, supplemental protein apparently is not necessary when using low protein corn in diets for finishing pigs.

(Key Words: Corn, G-F, Performance.)

Introduction

Because of the extensive moisture in the Midwest last year, the corn and other grain crops produced lower crude protein values

than typically observed. The low crude protein content caused speculation that pig performance might be adversely affected if diets were not adjusted for the decreased protein content. However, research conducted at other universities has suggested that the essential amino acid profile remains relatively constant when the protein content of corn changes. Therefore, the objectives of this experiment were to determine the effects of feeding low crude protein corn on growth performance of pigs fed from 135 to 240 lb and to determine if additional protein fortification is necessary.

Procedures

Low crude protein corn was purchased from south-central Nebraska, and the control corn was from a producer in northeast Kansas. Samples of the corn were collected and analyzed for crude protein content, and diets were formulated from analyzed values. The control diet was formulated to 14.6% crude protein (.70% lysine) with 8.5% protein corn (Table 1). Additional diets were formulated by substituting the low crude protein corn on an equal weight basis for the normal corn (13.5% CP). A third diet was formulated with the low crude protein corn and additional soybean meal to reach a total of 14.6% crude protein.

One hundred and fifty finishing pigs (initially 135 lb) were randomly assigned by sex, ancestry, and initial weight to one of the three dietary treatments in a randomized complete block design. Pigs were housed in a modified open-front building and allowed ad libitum access to feed and

water. There were ten pigs per pen and five replications per treatment. The study was concluded when the final weight of pigs reached 240 lb. At the conclusion of the study, all pigs were scanned with a Scan-o-probe at the last rib to determine fat depth.

Results and Discussion

Average daily gain and ADFI were unaffected ($P>.30$) by dietary treatment (Table 2). However, pigs fed the diet containing low protein corn without added soybean meal had improved feed efficiency compared with pigs fed the other dietary treatments. Last rib fat depth was not affected by dietary treatment. These

results indicate that small variations (8.5 to 7.5%) in the crude protein content of corn do not adversely affect pig performance. Furthermore, adding soybean meal to the diet to account for the decreased protein content of the corn had no benefit on pig performance and, thus, would not be economically justified. Research evaluating the relationship between the protein content and amino acid profile of corn suggests that when the protein content increases or decreases, this is a result of changes in non-essential amino acids rather than essential amino acids such as lysine. Our findings would support this concept. In conclusion, feeding finishing pigs diets containing corn with either 8.5 or 7.5% crude protein had no effect on performance.

Table 1. Diet Composition

Ingredient, %	Control	Low Crude Protein Corn	Low Crude Protein + Soybean Meal
Corn (normal)	80.91	--	--
Corn, low CP	--	80.91	78.33
SBM 48%	16.43	16.43	19.06
Monocalcium phosphate	1.03	1.03	.99
Limestone	.93	.93	.92
Vitamin premix	.15	.15	.15
Trace mineral premix	.10	.10	.10
Salt	.35	.35	.35
Antibiotic ^a	.10	.10	.10
Total	100.00	100.00	100.00
Calculated Analysis			
CP	14.6	13.5	14.6
Lysine	.70	.70	.77
C	.65	.65	.65
P	.55	.55	.55

^aProvided 50 g/ton of chlortetracycline.

Table 2. Effects of Low Crude Protein Corn on Pig Performance^a

Item	Control	Low Crude Protein Corn	Low Crude Protein Corn + SBM
ADG, lb	1.94	1.95	1.97
ADFI, lb	7.39	7.19	7.51
F/G	3.81 ^b	3.68 ^c	3.79 ^b
Last rib backfat, in	.86	.84	.83

^aA total of 150 pigs with 10 pigs per pen and 5 replications per treatment. Average initial wt = 137 lb and average final wt = 240 lb.

^{bc}Means on the same row with different superscripts differ ($P<.05$).